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ABSTRACT

The Environmental Education Project Center has developed these guidelines for teaching a unit in environmental studies. It is their intention that the teacher and student cooperatively plan the approach and content to be used during the course of study. In this unit about water, teacher resource information and student material are combined to form a teacher's manual for use in the primary grade levels. Project objectives, behavioral objectives, and pre- and post-test questions introduce the unit sections followed by ideas, actions, and/or activities to develop awareness of water qualities and pollution effects. Major topics of discussion range from uses of water, farmlot drainage, and watershed litter to the effects of sewage on streams and treating wastewater. Field trips emphasizing concepts previously learned are suggested and additional sources of information and materials for both students and teachers are listed. This work was prepared under an ESEA Title III contract for the project "Operation Survival Through Environmental Education." (BL)

ED 070680

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ENVIRONMENT

PRIMARY
Idea 3
Water

TEACHER MANUAL

FILMED FROM BEST AVAILABLE COPY

Title III
ESEA

"Operation Survival Through Environmental Education"

Environmental Education Project

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SE 015 554

ENVIRONMENTAL IDEAS

FOR THE STUDENT

-Water-

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I N T R O D U C T I O N

to

ENVIRONMENT Idea 3 Water

PRIMARY RESOURCE UNIT

The Title III, Environmental Education Project Center is providing your class with the following materials to teach a unit on water.

Student Manuals - 1 per student
Teacher Manual - 1
Supplementary Materials (as requested by the classroom teacher)

It is the project's intention to provide guidelines for the teacher and student to cooperatively plan the approach and content to be used during the course of study. All or part of the material can be used after evaluating the needs of the students.

The Environmental Education Project is evaluated by meeting objectives as outlined in the original project proposal. The resource units are written to meet these project objectives with additional material deemed necessary by the project staff, area teachers and administrators, and local environmental concerns.

A summary of the project objectives is provided to inform you of the areas being evaluated concerning the water unit. When using the curriculum materials, we urge you to teach toward these objectives.

- decrease in the number of drains from farmyard lots into drainage ditches and small streams
- decrease in the number of pounds of litter on a 50 foot section of Wood River Creek

- increase in the use of litter bags in automobiles

- increase in classroom use of films and filmstrips on environmental education

- increase in books and magazines relative to environmental problems checked out of school libraries and instructional materials centers

- increase in number of subscriptions to periodicals and other publications relative to environmental education

Students and families of students involved in the project are evaluated on the basis of the above stated objectives. Any different approach that you and/or your students might conceive that will further develop these objectives will be most welcome at the Project Center.

A concept-activity file is constantly being formulated at the Project Center to supplement the resource unit. Additional activities should be evaluated and used to increase motivation and interest depending on the students' background.

The concepts as stated in the original proposal are further stated in the field trip section. These concepts are primarily concerned with the water unit. Additional concepts should be developed to meet the needs of the individual teacher and students at the appropriate grade level.

Behavioral objectives are necessary to devise a method of evaluation and proper instruction. The following behavioral objectives are listed as a basis to follow in the teaching of the water unit. Additional objectives should be devised by the teacher as they apply to the individual needs of the students.

1. Students will recite the parts of the water cycle in order.

2. Students will identify visually the different ways they use water.

3. Students will identify the three forms of water.

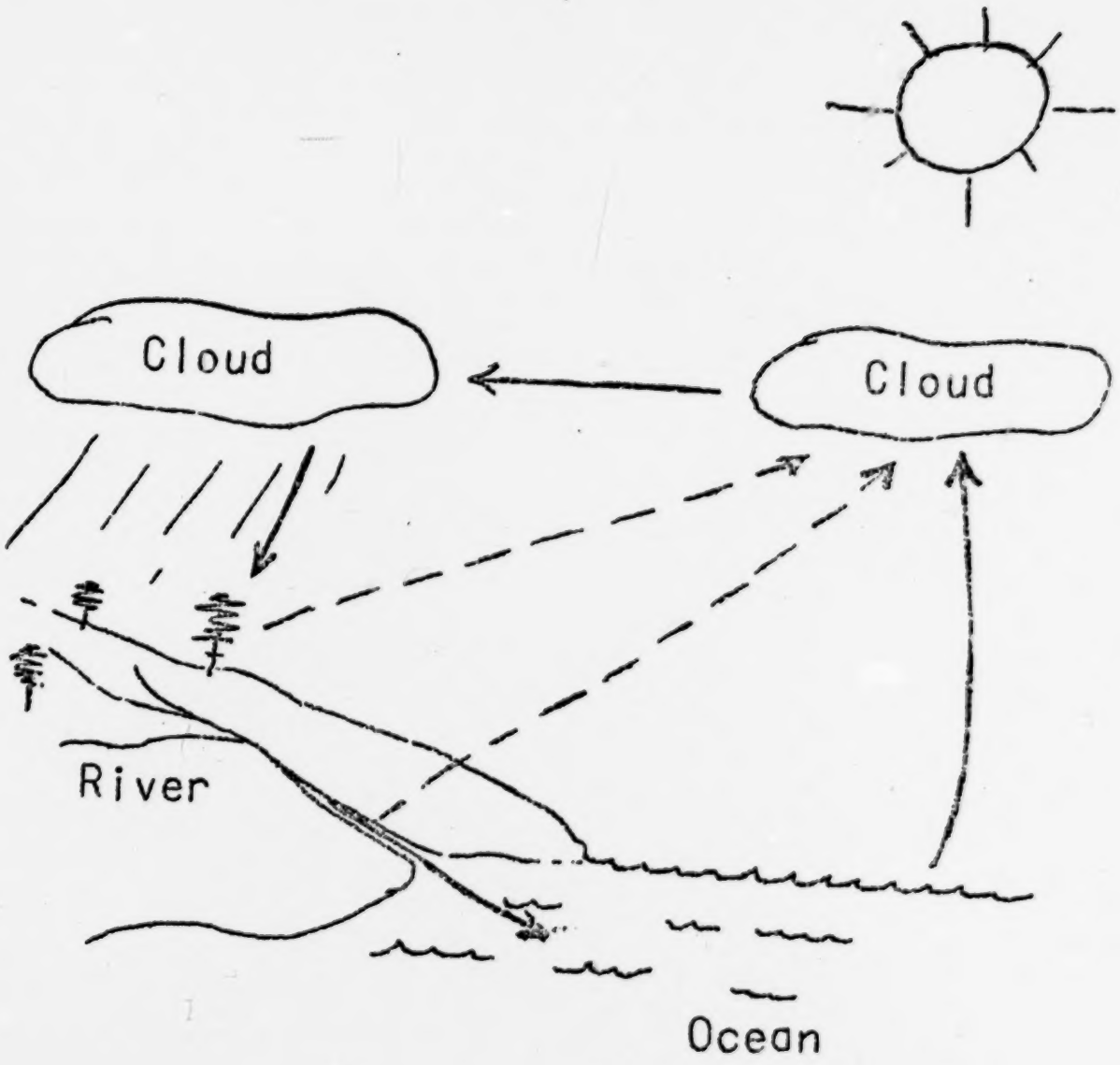
4. Students will verbally identify some major pollutants of water.

5. Students will recite several positive actions needed to clean up water pollution.

A pre-test and a post-test must be given to each student. Included in the teacher's packet of supplementary materials is the student test to be duplicated and distributed to each student. The teacher's answer sheet is included in this guide. After completion of the pre- and post-test, please grade and provide the Project Center with the test results. We would prefer the percentage gain or loss for the entire class. Provide this necessary information by completing the teacher evaluation form.

The teacher's manual includes the actual student guide plus guidelines for the teacher to use while instructing students. Action 6 and 7 are for your use in conducting field trips and determining what resources you want to use.

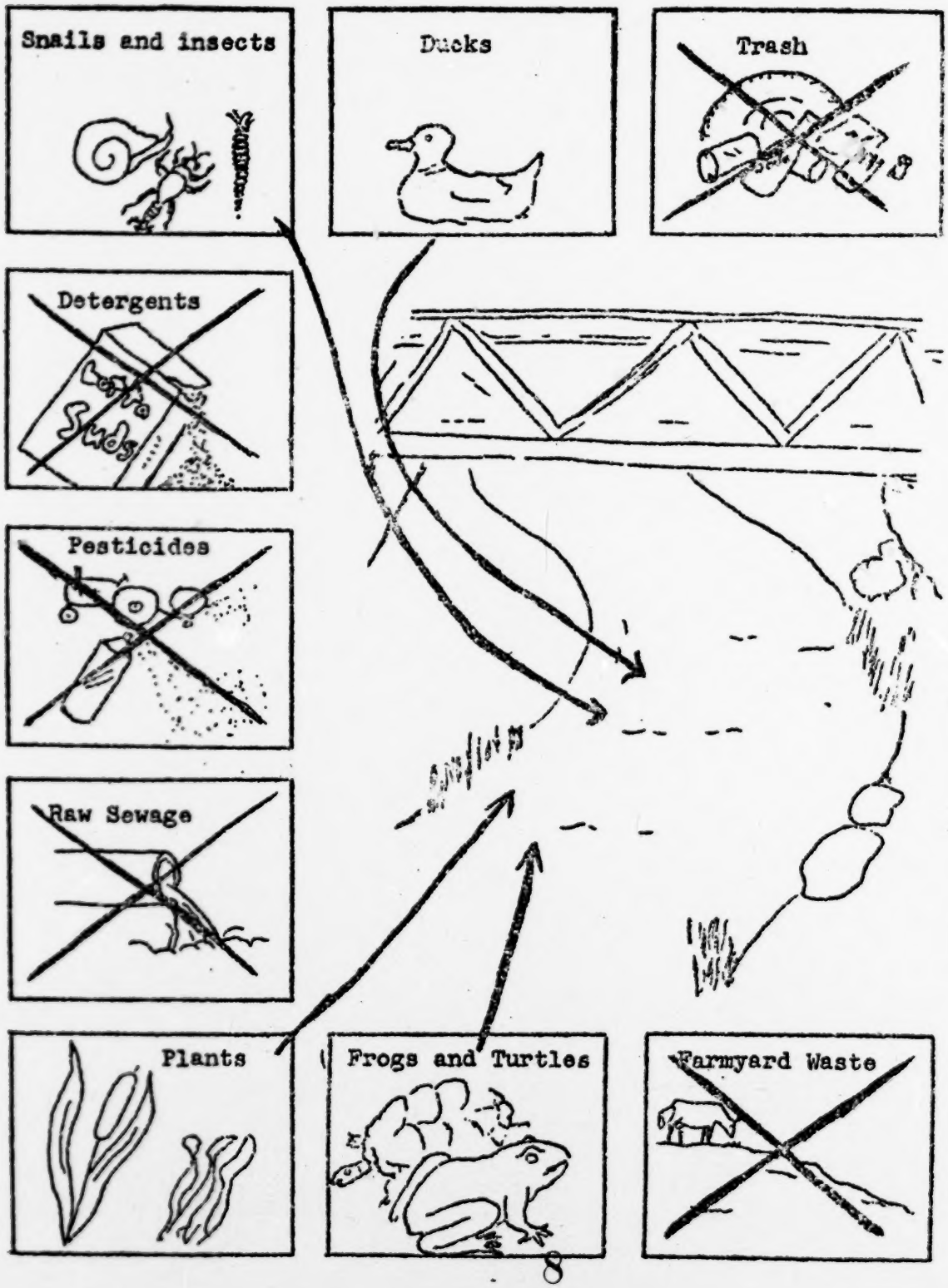
Not included in the teacher's manual are the transparency masters and the charts/forms for student use. These items are included in the teacher packet of supplementary materials. This arrangement will allow you to make multiple copies to distribute to your students. You are invited to obtain a teacher packet on a loan basis from the Title III, Environmental Education Center. Our telephone number is 618-786-3313.



Draw arrows showing the paths that water can travel in the Water Cycle.

Draw a line from what should be in a creek to the creek.

Put an X over what should not be in the creek.



ENVIRONMENT

Idea 3
Water

ENVIRONMENTAL IDEAS FOR THE STUDENT

This guide to environmental ideas is written to provide a better understanding of some of the environmental problems you will face in the future. It is also written in such a way that you will be able to make your own value decisions about what has to be done to maintain and improve the world in which we all live. The interest that you have is directly related to the amount of involvement that you give in the solution to the problems of our surroundings.

PLEASE DO NOT MARK IN THIS BOOKLET. OTHER STUDENTS WILL WANT TO USE IT WHEN YOU ARE FINISHED.

ENVIRONMENT

Idea 3
Water

Action 1

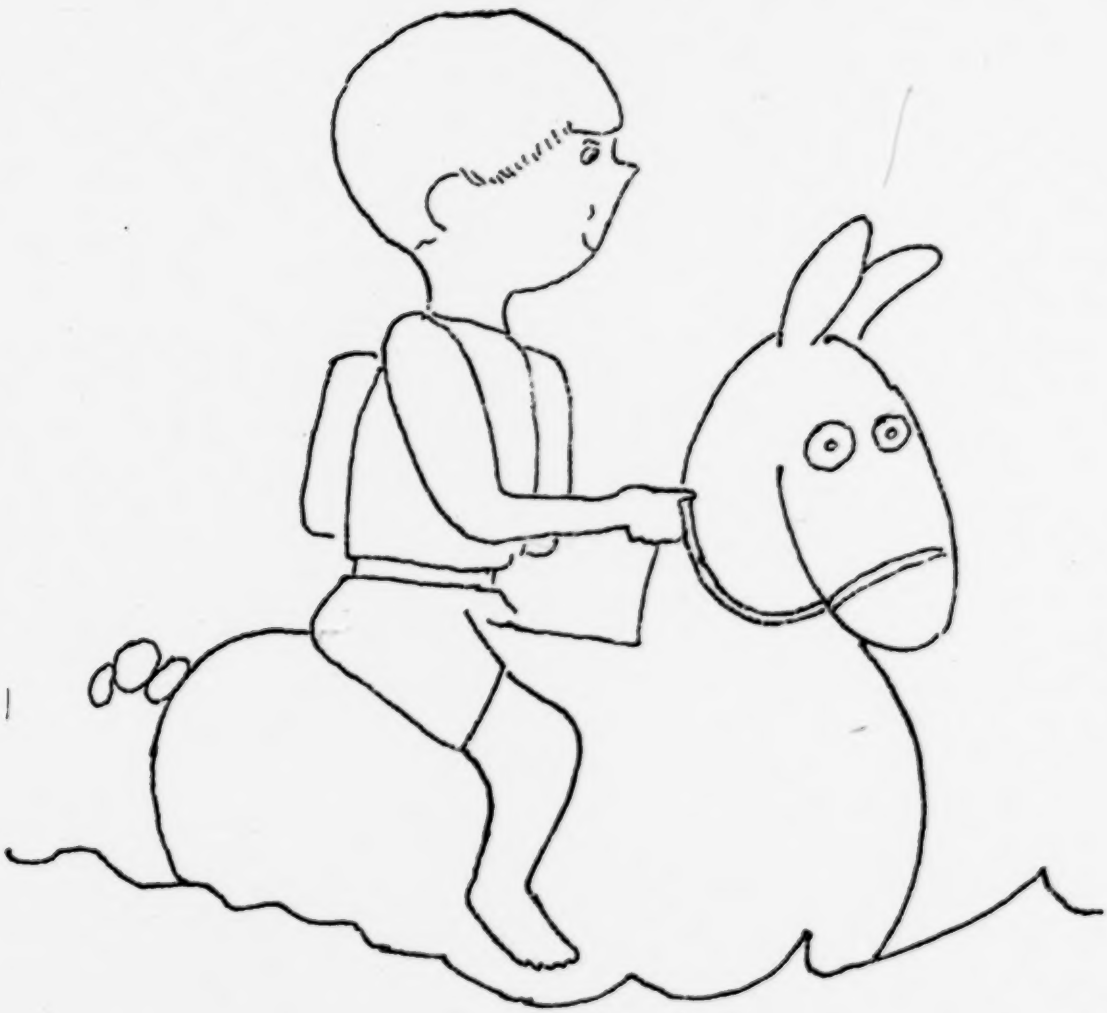
Water, Water, Everywhere...

Did you take a drink of water today?

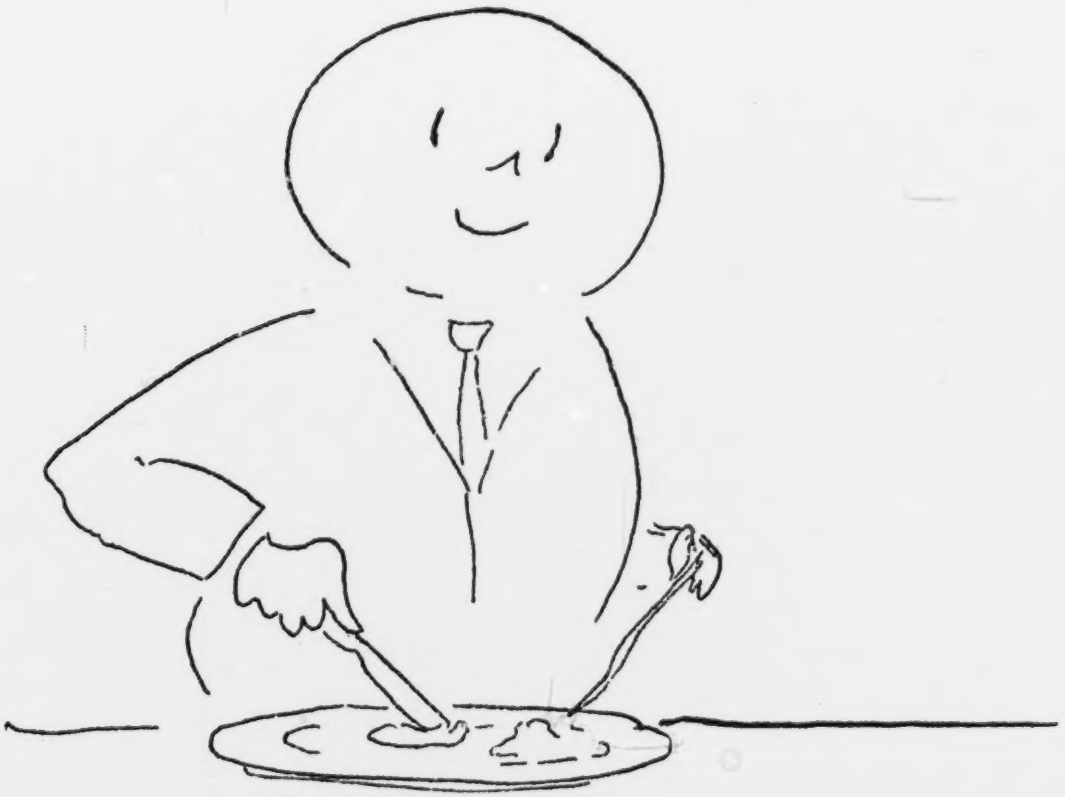
Where did it come from?

What else did you use water for today?

DID YOU PLAY. IN WATER?



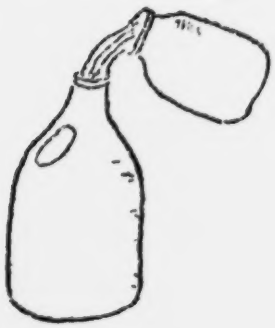
DID YOU EAT SOME FOOD?



HOW MUCH WATER DO YOU NEED?

Take a gallon jug and a quart bottle.

Fill the quart bottle with water and pour it into the jug.



Do this two times.

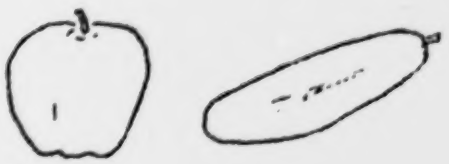
Then fill the quart bottle only one-half full and pour it into the jug.

This is the amount of water you need in one day to stay healthy.

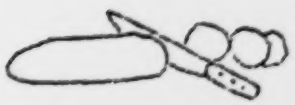
You don't usually drink that much water.

Where do you get some of your water?

Take an apple or cucumber or some other fruit.



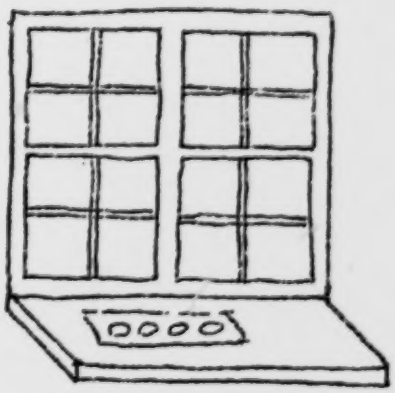
Slice it into thin slices.



Weigh the slices.

Now put the slices on a piece of paper.

Put them on a sunny window sill.



Leave them until they are very dry.

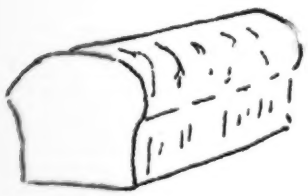
Weigh them again.

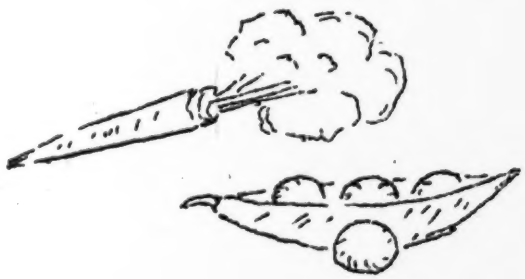
What is gone from them?

Do you know where you get some of your water?

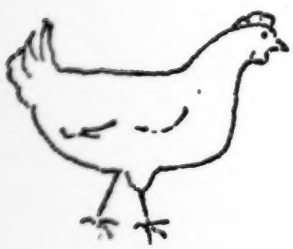
This is only water your body needs.

It also takes water to grow your food.





Animals need water to make food.

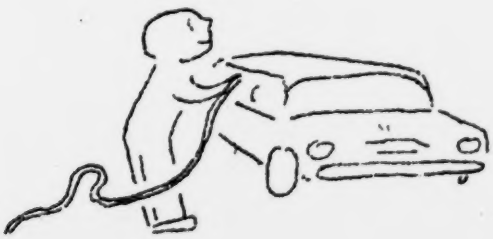


You really use a lot more
water than what you drink.

You need water to keep clean

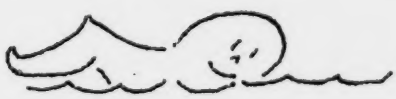
To wash your clothes

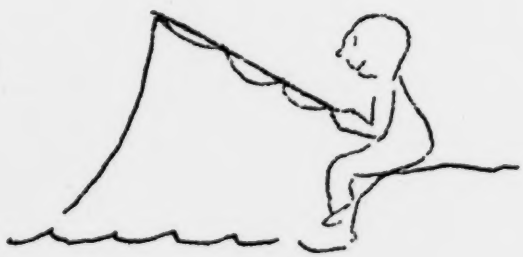
To wash your car



You need water to make things
Automobiles
Bicycles
Roller Skates

You need water for fun





Can you think of some other ways you use water?

TEACHER'S GUIDE

ACTION I

The idea that water is necessary for life is probably not new to children. The extent to which they depend upon water may be new, however.

Although the amount of water needed by an individual varies according to size, activity, climate, and other things, the average is about 2½ quarts per person per day. (One source states 4½ lbs.; about the same.) All of this is not taken into the body as drinking water. Stress to the children that we get our water in many ways; soda pop, milk (about 90% water), even seemingly dry foods contribute some moisture.

It also takes water to grow the food we eat.

1,000 gal.	⟶	1 qt. of milk
60 gal.	⟶	1 lb. of dry wheat
2,500-6,000 gal.	⟶	1 lb. of meat
50 gal.	⟶	1 corn plant through the season

Our other uses of water also require a great deal of water.

An average American will use in one day:

4 gal. for cooking and washing food
14 gal. for bathing and washing self
60 gal. for laundry, toilet flushing, etc.

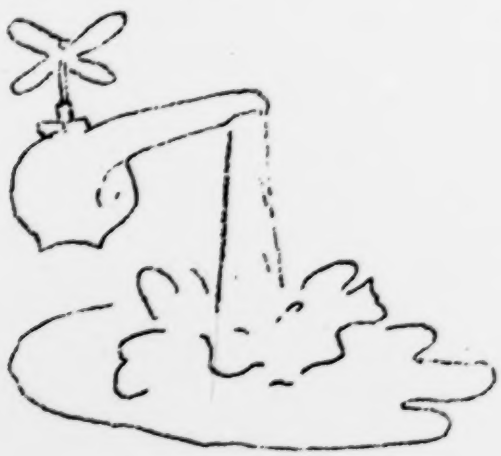
Pictures on pps. 2 and 3 are coloring pages for younger children.
Equipment Needed for experiments:
How Much Water Do You Need?
gallon container
quart container
apple, cucumber or?

ENVIRONMENT Idea 3 Water

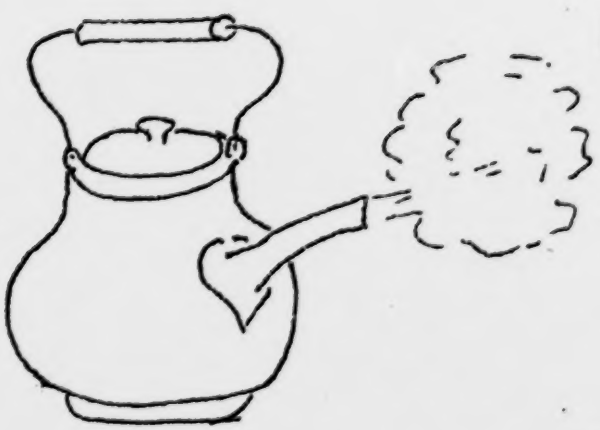
Action 2

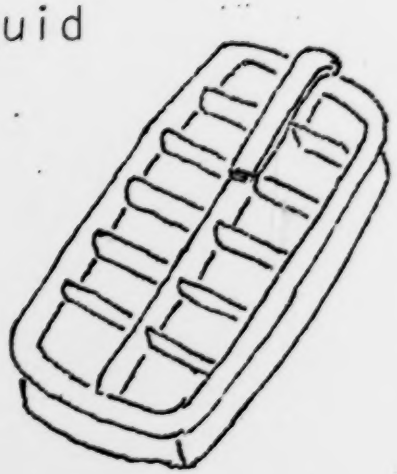
What is Water?

Water can be:



Liquid

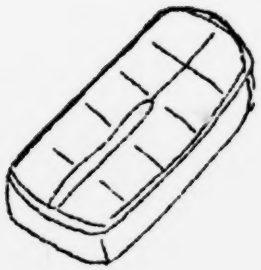




Gas as in steam

Solid as in ice

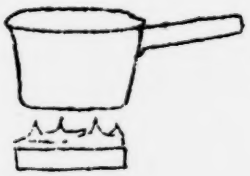
A. Water can change.



Get some ice cubes.

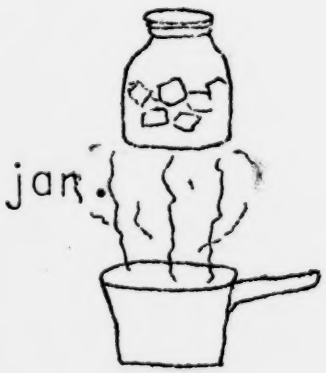
Put them in a warm place.

What happens?



Take the water from
the ice cubes and
heat it.

Now where does the
water go?



Put some ice cubes and
water in a jar.
Dry the outside of the jar.
Hold it in the steam
from the boiling water.

What happens now?

What would happen if
this water was placed
in a freezer?

Many Things Dissolve in Water

Get several small jars or glasses of water.

Now put something in each jar.
You might try:

- Kool-Aid
- Sugar
- Salt
- A Nail
- A Stick
- Some oil
- Instant Coffee

or anything else you might want to try.

What happens?

Can you explain why?

Now put some dirt and water in a jar with a lid.

Shake until all the water is muddy.

Set the jar down and let it alone for awhile.

What happens?

Why?

Get two glass jars just alike.

Put exactly the same amount
of water in each. (one pint is about right)

Make a mark on each glass
where the level of water is.

Now put 1/2 cup salt in one
glass. Keep stirring until
no more salt can be seen.

Now put 1/2 cup sand in
the other jar. Stir them also.
Does the sand disolve?

Is there a difference in the
water level now?

What happened to the salt
that didn't happen to the sand?

TEACHER'S GUIDE

ACTION 2

For all life, water is necessary. For many uses, it is convenient. In much of its functioning, it is commonplace.

But commonplace things often are the least appreciated and the hardest to understand.

(Water, The Yearbook of Agriculture, 1955)

Water is:

H_2O, 2 atoms of Hydrogen, 1 atom of Oxygen

Colorless, Odorless, Tasteless

Poor Conductor - Good Solvent

At sea level atmospheric pressure:
Solid (ice) below 32°F (0°C)
Liquid between 32°F (0°C) and 212°F (100°C)
Gas (water vapor, steam) above 212°F (100°C)
Only common substance that naturally occurs in all these three states.

There are a trillion trillion molecules in one ounce of water.

A. Equipment needed for experiment: tray of ice cubes, source of heat (hot plate or bunsen burner), pan, tongs or stand, glass jar and metal pan.

B. One teacher had her students bring baby food jars with water and something else in them. This included items that floated on water; oil, sticks, paper, items that would settle out of water; dirt, sand, metals and items that dissolved in water; Kool-Aid, instant coffee, sugar and salt. All were pollutants, but the effect and removal of the different types is quite different.

Equipment needed for experiment: 2 quart jars, ½ cup salt, ½ cup sand, 2 pints water (exactly the same) and a grease pencil.

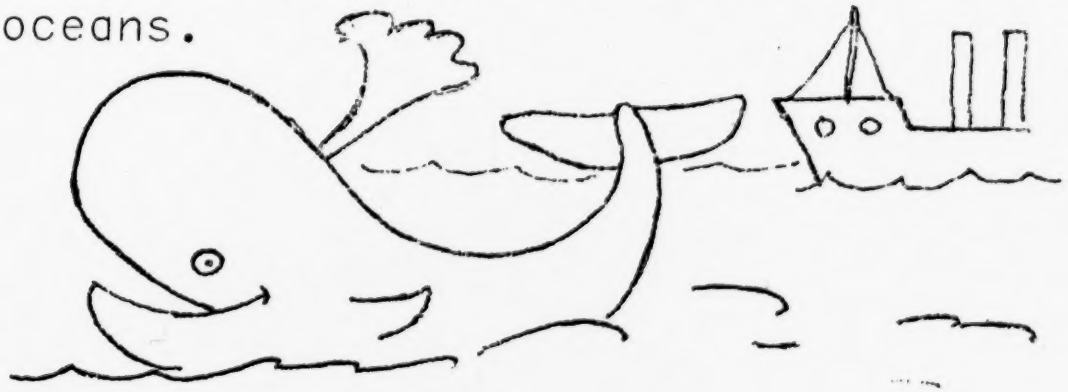
ENVIRONMENT Idea 3 Water

Action 3

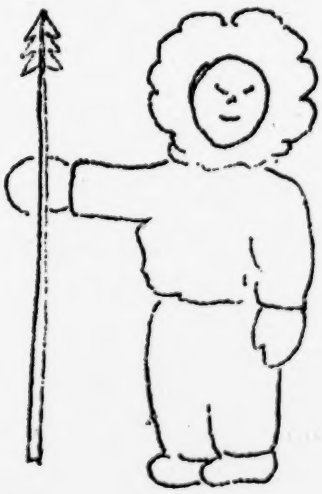
Where is our Water?

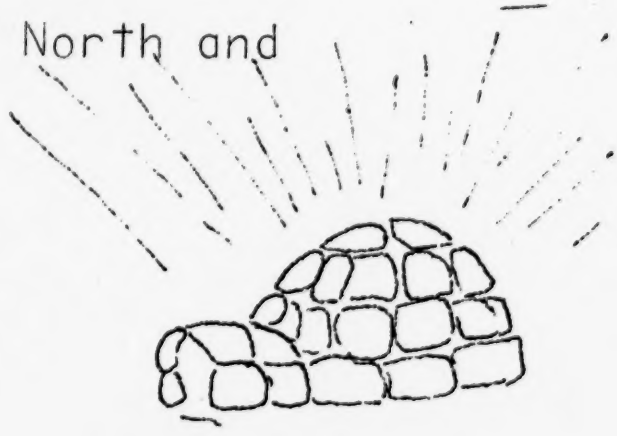
A. Round and Round It Goes

Most of the water on the earth is in oceans.



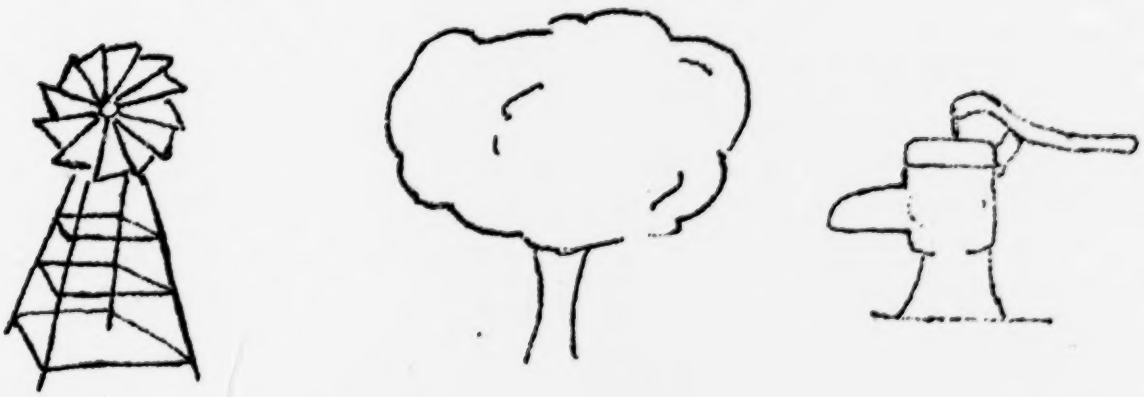
Some is ice at the North and South poles.





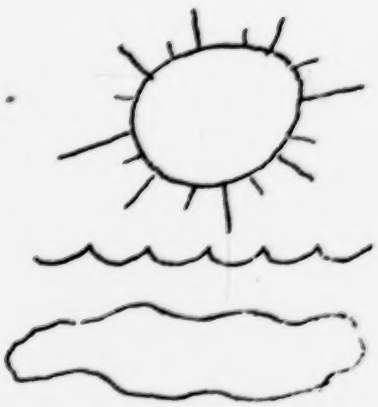
Some is in rivers and lakes.

Some is under the ground.



Some is in the Air.

The water in oceans, lakes and rivers is heated by the sun.

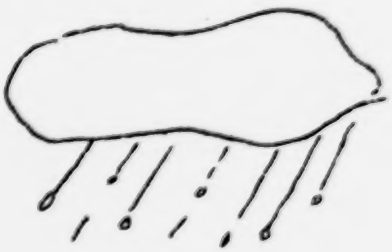


Part of the water becomes a gas.

This gas forms clouds.

The clouds may travel hundreds of miles.

When they cool off, what do you think happens to the water?



When rain falls, some water runs off the top of the ground.

Some water soaks into the ground.

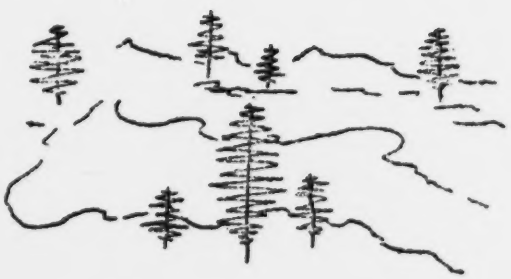
The water in the ground may be used by plants.

The water goes into the plant's roots.

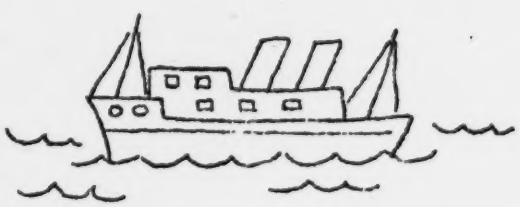
Then it goes up the stem to the leaves.

The leaves let some of the water go into the air again as a gas.

Water that runs off the top of the ground goes into streams and rivers.

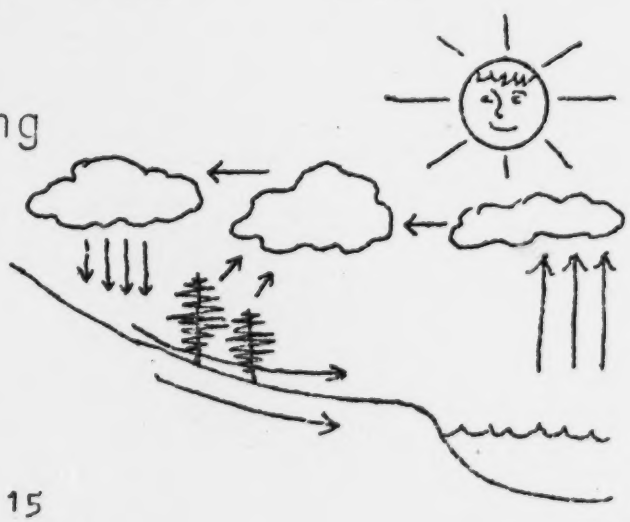


Some will get back to the ocean.



If we put all this together, we see that water is moving in a "cycle".

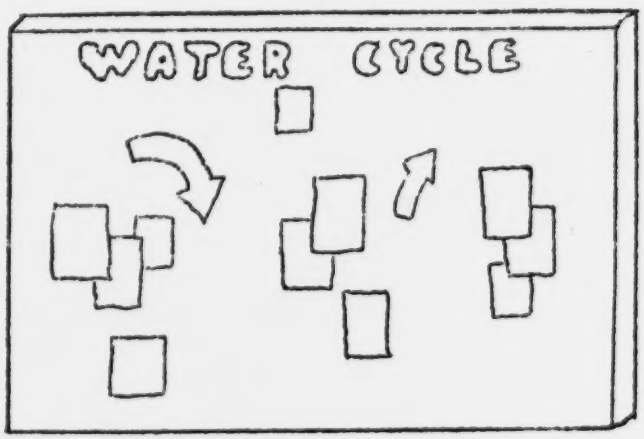
We call this the "Water Cycle".



B. Perhaps your class would like to make a mural of the Water Cycle.

Collect pictures of:

clouds
rain
streams
oceans
rivers
trees
other plants
the sun
people
-
-
-
-
-
-
-



Arrange them on a bulletin board to tell the story of the water cycle. Include both good and bad things that happen to the cycle. Use lots of pictures.

TEACHER'S GUIDE

ACTION 3

A. Water Cycle

Taking the earth as a whole, the cycling of water is a closed system. The amount of water is constant. About 97% of it is salt water in the oceans of the world. A little over 2% is frozen water in ice masses and glaciers. The remaining 1% is in the form of water vapor in the atmosphere, underground water, and water in lakes and streams. This 1% is in constant motion from the atmosphere to rain and snow to runoff to the ocean and back again.

Eventually, all water will go through the cycle, but there is a difference in time. Water locked deep in glaciers or in deep ground water may be there for many years or even centuries, but it cannot be considered to be outside the cycle.

Although the cycle has no beginning, nor end, we must begin somewhere. Starting at the major storage area, the oceans, which cover 3/4 of the earths surface; the liquid water evaporates into the atmosphere as a gas. The energy required to do so comes from the sun. As the water vapor rises, it cools and condenses into clouds. Sooner or later it has cooled enough to fall as precipitation, which may be as rain, snow, sleet, or hail. Much of this immediately evaporates again, some before reaching the ground. Another portion of it is used by plants and transpired by them back into the atmosphere. This combination of evaporation and transpiration accounts for about three-fourths of the total precipitation. The rest of the precipitation moves over and through the land areas, going finally into the ocean.

It is estimated that an average of 2000 billion gallons of atmospheric moisture pass over Illinois each day. About 5% or 100 billion gallons falls as precipitation. Of this, 44 billion gallons evaporates back into the atmosphere from land and water surfaces. Growing plants use 33 billion gallons which is transpired into the atmosphere. The remaining 23 billion becomes streamflow and ground water and eventually moves out of the state.

There are several experiments that demonstrate various aspects of the water cycle. Put a living plant in a clear plastic bag and place it where it can get sufficient sunlight. Some water drops will condense on the inside of the bag. Putting a celery stalk into a glass of colored water will show how water (and minerals) move through the stalk of a plant.

A. Water Cycle (Continued)

Use a damp rag and wipe a wet spot on the chalkboard. Observe. Where does the water go? Answer: It evaporates.

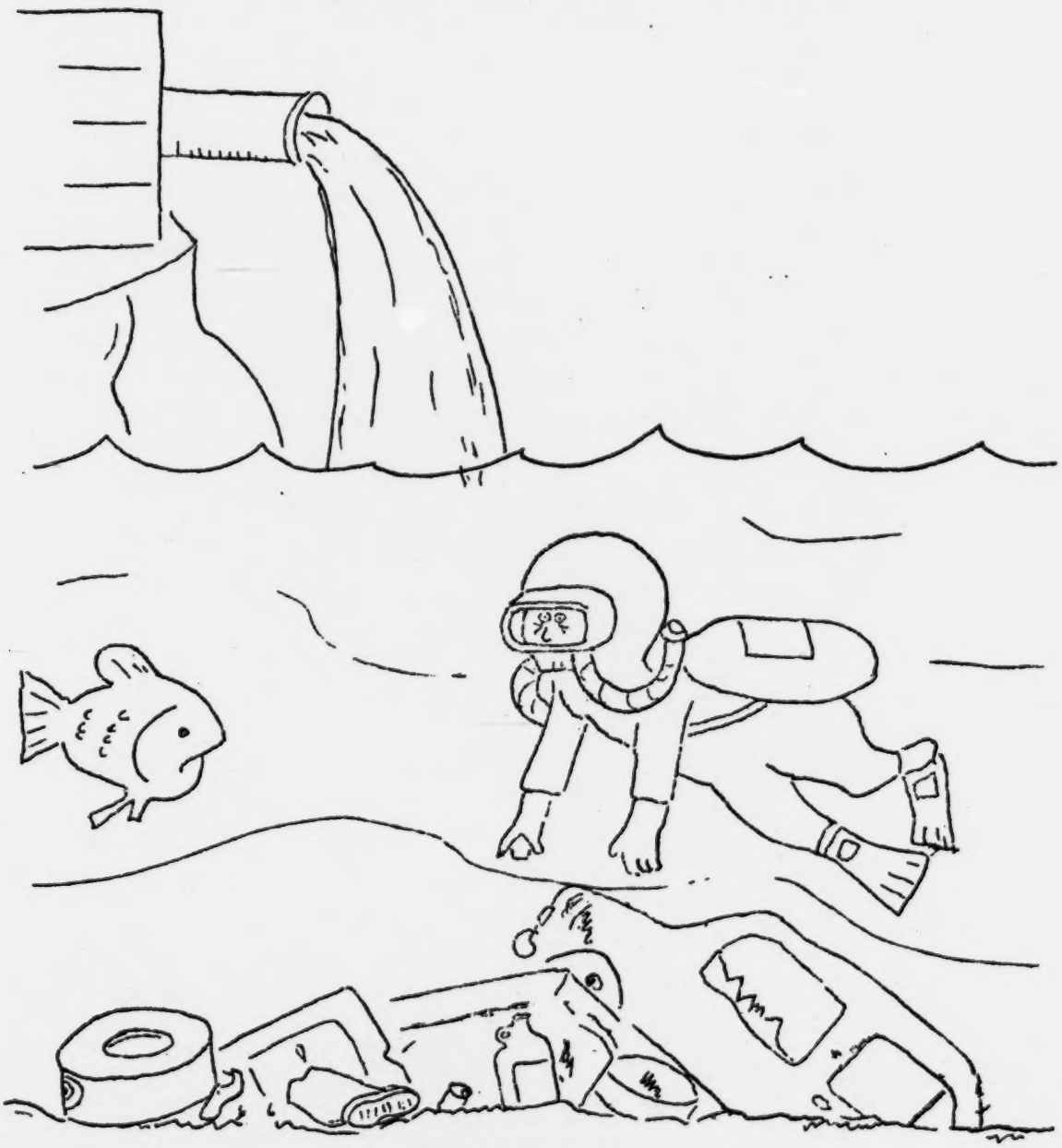
A teacher might try; as one kindergarten teacher did, having the children play out the water cycle; first, be clouds floating around, then rain falling, then puddles of water on the ground, streams flowing, and then water evaporating back into the atmosphere.

B. The collage suggested for the water cycle bulletin board may be as simple or as elaborate as interest and time permit.

ENVIRONMENT Idea 3 Water

Action 4

What Happens to Our Water?



How Much Pollution is Too Much?

A. What is "Pure" water?

Get a small glass of water from the drinking fountain.

Taste it. Smell it. Look at it.

Is the water pure?

Put a few drops of the water on a small glass dish. Put it in the sun. What is left after the water is gone?

Now take two gallon jars. Fill each almost to the top with water.

Label them

Use food coloring and put one drop in jar A.

What happens?

Wait until the drop disappears
Then put in another drop.

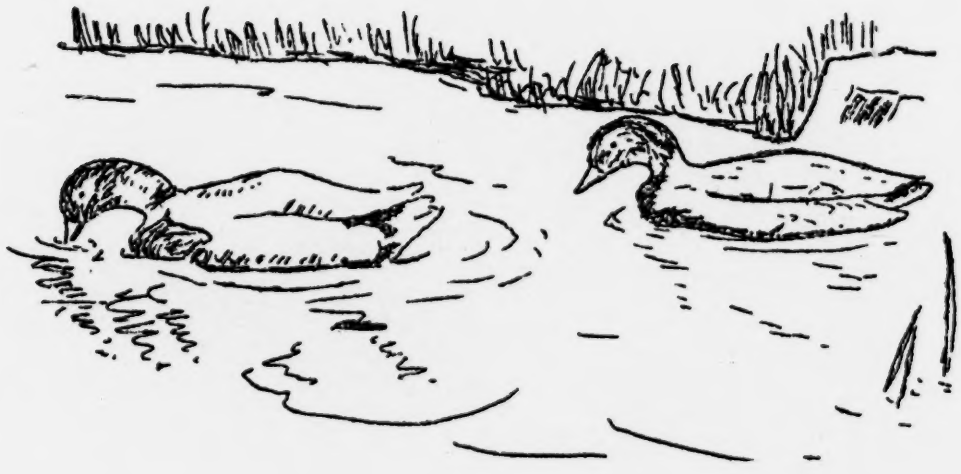
Now keep putting in drops of coloring one at a time and stir them until jar A is definitely a different color than B.

Keep count of your drops.

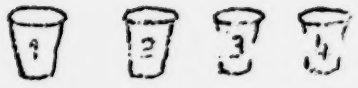
How many did it take to color the water?

B. What Else?

What do you think oil spilled from oil wells or tanker ships does to birds?



Take 4 jars or glasses
Label them
Put clean water in them.



In # 1 put several drops
of soapy water
Put the same amount of water
that has detergent (high phosphate) in #2.

Put several drops of pond water in
1, # 2 and # 3. Leave # 4 alone.

Put them where they will get
some sunlight.

Observe them for several days.

What happens?

Did the detergent water make
the green stuff grow rapidly?

What are your conclusions?

C. We Use Water Over And Over

We cannot make water.

The water we have now is all
we will ever have.

We must re-use water.

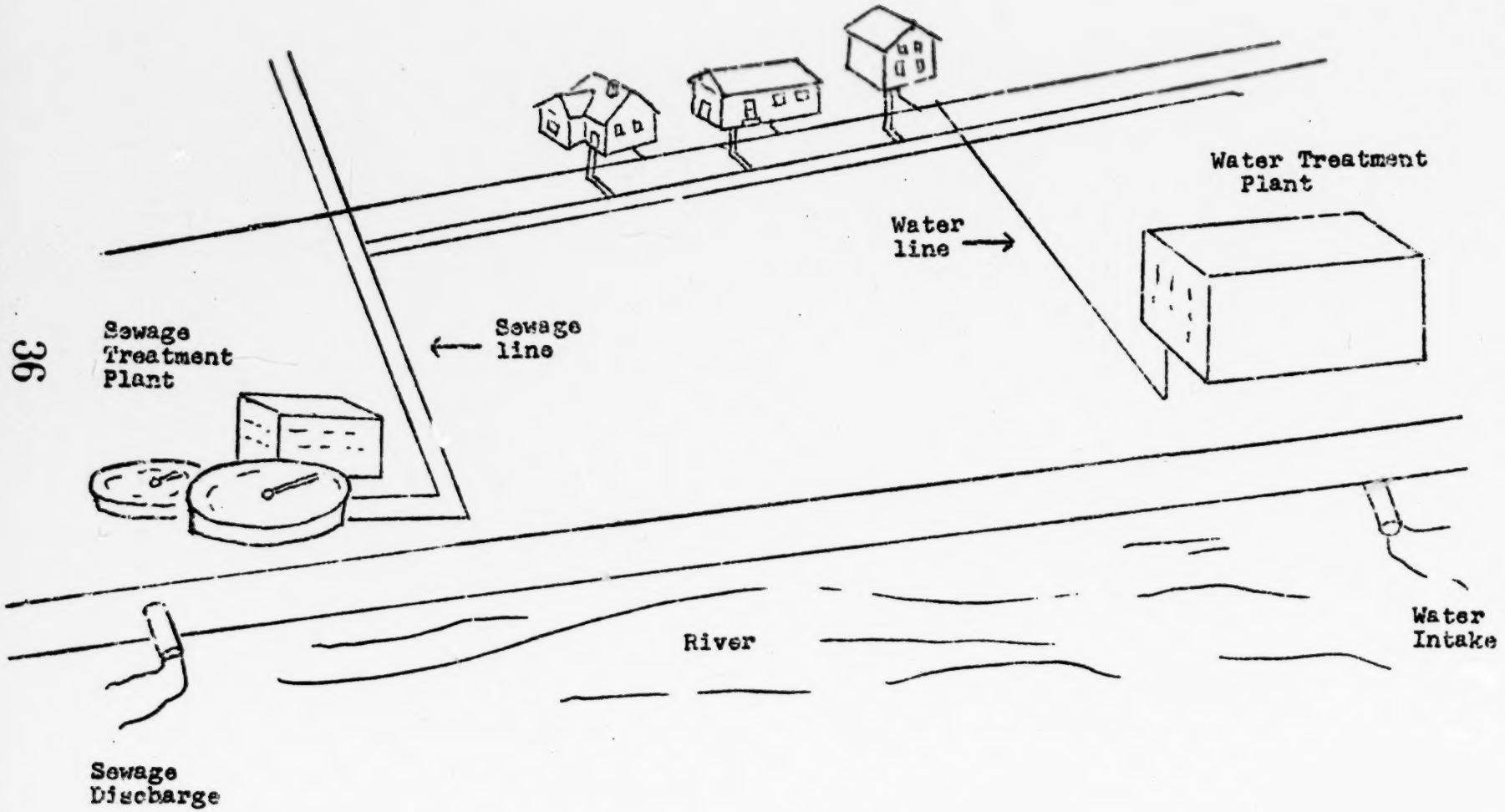
Do you know a big river close by?

Where do towns and cities close
to the river get their water?

Where do they put their waste water?

Water in some rivers is used
as many as 50 times.

How can dirty water be reused?


Water Treatment Plant
Water line
Sewage Treatment Plant
Sewage line
River
Water Intake
Sewage Discharge

TEACHER'S GUIDE

ACTION 4

A. There is no such thing as "pure" water. All water is contaminated to a greater or lesser degree. The question is; how contaminated is it?

The exercise with evaporating a few drops of water should result in a noticeable residue of some type. Drinking water commonly contains chlorine and other dissolved solids and the residue left behind will demonstrate that drinking water contains other material besides water.

The amount of a certain contaminant necessary to be noticeable in water is demonstrated by putting food coloring drops into a gallon of water. Jar B is the control.

The following may also be used for this: Obtain several quart jars almost full of drinking water. Into one jar put 1 cube of sugar (198 cubes per pound). Into the 2nd, put 2 cubes, into the 3rd put 4 cubes, and so on as far as you wish to go. Use small paper cups and have the children taste samples from each jar. Which sample tastes sweet? There may be individual differences in taste so each child may not detect the sweetness in the same sample.

Scientifically, small concentrations of substances are measured in parts per million (ppm) or in milligrams per liter (mg/l); both measurements being the same thing. One sugar cube in 606 gallons of water would be about 1.0 ppm.

The Illinois Pollution Control Board has some standards for the level of contaminants that can be released into the state's waters. Some of these are:

	Concentration (mg/l)
Arsenic	0.25
Cadmium	0.15
Copper	1.00
Cyanide	0.025
Flouride	2.5
Iron (total)	2.0
Lead	0.1
Mercury	0.0005

There would, of course, be a margin of safety built into these standards, the toxic amount being higher than the standards. This does show that for some contaminants only a very small amount can be toxic.

B. What Else?

Birds are able to float on water because of the air trapped within their feathers. Oil and other pollution destroys this ability. The insulating effect of the trapped air is also lost.

Many modern detergents contain a quantity of phosphorus to give clothes that "clean" look and to soften the water. This phosphorus is not removed from wastewater going through sewage treatment plants. In addition, nitrogen and phosphorus from farm fertilizers are washed from fields into lakes and streams. All of this "extra" fertilizer causes small green plants called algae to multiply and grow much more than normal until they may clog the bodies of water.

In the course of time, the algae plant dies and settles to the bottom of the lake and decays. The decay organisms use oxygen from the water, and if there is a large amount of algae, they may deplete the oxygen content of the water to such an extent that other organisms such as fish cannot survive.

In the experiment with the 4 glasses of water, soap and detergents, make sure the pond water has some algae in it. The glass with the detergent should have more algae than the others.

C. We Use Water Over and Over

By now it should be evident that water is reused many times. It must be cleaned before most of man's uses and when he is through using it, it goes back into the river. The picture of a water and sewage system may be used as an aid in discussing the uses and treatment of water in a city.

ENVIRONMENT Idea 3 Water

Action 5

How Can We Have Clean Water?

A. Jim's Fishing Hole

Jim was happy. He had his fishing pole over his shoulder. He had a can of worms. He had hooks and a line. He was going fishing! He was going to his favorite fishing hole on the creek. But when he got there, he found that something awful had happened! There were dead fish on the bank. The water looked "yuk!" and smelled even worse.

What did Jim do? Can you finish the story?

After each person in the class has finished their story, read as many as you can to the class. Have someone write the different ways of doing something on the board. Talk about the ways. Are some of the ways good ways? Do they give you any ideas on how to clean up water in your own areas?

TEACHER'S GUIDE

ACTION 5

A. Jim's Fishing Hole

Use Action 5 as a time for the children to write, tell, or draw a story about what Jim could do to clean up his fishing hole.

This might be an "open-ended" story. One child begins telling a part of the story and then ends abruptly, leaving the story unfinished. The next child must take up where the first left off, and so on.

B. Story Time

Title III, ESEA has a story on water molecules for you to check out and present to your class.

ENVIRONMENT Idea 3 Water

Action 6

Field Trip

A field trip is to be taken during your teaching of the water unit. The field trip is an integral part of the water unit. It emphasizes the concepts learned, or to be learned by the students. On-the-spot observation is a valuable learning technique. Consult the "Teachers' Policy Handbook" for field trip dress, discipline, and general instructions.

A. Why?

Mind filling, factual, see-all field trips have been a traditional approach to the field trip in the past. The question is, "Is the child given any responsibility for learning on his own?" Does he retain more from being spoon-fed facts or from being allowed to learn from his own interest and involvement?

Experience and research indicate that children learn more when they become personally involved in the learning process. This can be achieved by allowing the child to participate in the initial planning of the field trip, and to select a specific investigation on the field trip for which he will be responsible. These specific investigations will be within the bounds of the concepts to be presented on the field trip and in the unit.

The concepts below are only a few of the many that students should come to understand when learning about the environment. Additional concepts to be presented are as follows:

1. Water is a natural resource.
2. All living organisms need water.
3. Water is used for many purposes.
4. The properties of water are unique.
5. Water is a renewable resource that moves in a cycle.
6. Water is often contaminated until it is difficult or impossible to use.

B. Where?

A water unit field trip can be taken to many different places, from a downspout, from a roof or a small puddle to a trip to a river or lake. The usual trip, however, will be to a nearby stream, pond, or lake. For purposes of illustration, we will consider a trip as a: "Visit to a Small Stream." Refer to Field Trip Guide.

C. How?

The activities suggested may be carried out at almost any stream site in almost any weather. Hopefully, the activities tie in well with the classroom material content and illustrate the concepts being considered.

Activity 1 - Need For Water

Included in the teacher's packet and teacher's guide is an activity sheet that may be duplicated so each child has a copy. They will also need a pencil. As the trip progresses, have the children complete the sheet.

Activity 2 - Properties of Water

Have the children collect various rocks and pebbles found alongside the stream. Smooth, worn pebbles illustrate the wearing action of water, rough pebbles indicate that they haven't been moved far by water.

Depending on the site, soil erosion may be evident, as well as sand or gravel bars. The material on the bottom of the stream may indicate the speed of the water flow.

Activity 3 - Water Cycle

Ask such questions as: Where is the water coming from? Where is the water going? What will happen to it?

Activity 4 - What Happens to Our Water?

Take a clear quart jar with lid. Put about a cup of soil material in it (include sand, small gravel, silt, and clay). Fill almost to the top with water, shake vigorously, and then let set for several minutes. Emphasize that rapidly moving water carries a great deal of material with it, while quiet water lets the material held in suspension settle to the bottom. (The heavier material will settle out first, so you will have layers of gravel, sand, silt, and finally clay.)

Activity 4 - What Happens to Our Water? (Continued)

Have the children look for pollution of the water; sources and evidences. From the classroom activities, they should realize that all of the pollution isn't going to be visible.

If more than one site on the same stream is visited, water samples from each site may be compared for amounts of pollution.

Younger children won't be able to do complicated analysis on water, however, just comparing the water samples visually is often effective.

Activity Sheet

Draw a line from the picture of each animal you see to the place it would live.

ENVIRONMENT Idea 3 Water

Action 7

"A River of Resources"

Often teachers desire additional reading material, visual experiences or discussions to enrich a student's learning experiences. Listed below are materials which may be borrowed from the Environmental Education Project Center, area resource people, and free films.

A. Pools of Knowledge

The Project Staff has accumulated and filed a number of pamphlets, newspaper clippings and magazine articles which are available to teachers for use as resource material. Teachers may borrow for two weeks, articles from any headings in the vertical file. Articles may be obtained by mail, by contacting one of the Project Staff or by calling the Project Center at 618-786-3313. The following headings pertaining to water appear in the file.

Agricultural Pollution
Amphibians
Aquarium
Conservation - Water & Air
Ecology
Ecology - Swamps
Erosion
Estuaries
Fish
Fish - Industry
Gov't Control - Federal - Pesticides
Gov't Control - Federal - Water
Gov't Control - Illinois - Water

Lakes
Natural Resources
Oceanography
Oil Spills
Oxygen - Dissolved
Pollution Control - Costs & Financing
Stream Ecology
Waste Water Treatment
Water - Aquatic Biology
Water
Water - Recycling
Water Cycle
Wildlife - Lakes, Streams & Marshes
Water Pollution
Water Pollution - Control
Water Pollution - Detergents
Water Pollution - Health
Water Pollution - Nitrates
Water Pollution - Oceanic
Water Pollution - Ponds & Lakes
Water Pollution - Siltation & Sedimentation
Water Pollution - Streams & Rivers
Water Pollution - Thermal
Watershed
Water Quality Studies

B. Stepping Stones for Students

The Project Center also has multiple copies of certain resource materials which may be borrowed by a class for use by students or by the teacher as background information. If the teacher desires, and the materials are available, each student may study a copy of a pamphlet for a maximum of two weeks. Such bulk requests should be directed to the Project Staff.

All of the materials listed below were obtained free of charge unless otherwise noted. The teacher or school librarian may obtain permanent copies for his/her building or classroom by directing requests to the following agencies. (Grade levels are indicated by: Primary, Intermediate, Jr. High, and Sr. High).

1. Office of Public Information
   Federal Water Quality Administration
   U.S. Department of the Interior
   Washington, D.C.

   "About Boats and Water Pollution" — I
   "Needed: Clean Water" — I,J,S

2. Office of Public Information
Federal Water Pollution Control Administration
U.S. Department of the Interior
Washington, D.C.

"Showdown for Water"	I,J,S
"A Primer on Waste Water Treatment"	I,J,S
"Mine Acids"	I,J,S
Posters: "Wanted for Murder: Water Pollution"	P,I,J,S
"Stop Water Pollution"	P,I,J,S

3. Manufacturing Chemists Association
1825 Connecticut Ave., NW
Washington, D.C. 20009

"Background Information on Water Pollution Control"	I,J,S
"Everyday Facts About Good Water"	I,J

4. Superintendent of Documents
U.S. Governmental Printing Office
Washington, D.C. 20402

"Clean Water for the 1970's" price: $1.50	J,S
"What You Can Do About Water Pollution" price: 15¢	I,J,S

5. Izaak Walton League of America
1326 Waukegan Road
Glenview, Illinois 60025

"Clean Water - It's Up to You"	I,J,S

6. State of Illinois
Department of Conservation
400 S. Spring Street
Springfield, Illinois

"Digest of Illinois Boat Registration & Safety Act"	J,S

7. Humble Oil and Refining Company
Public Relations Department
Room 4192
P.O. Box 2180
Houston, Texas 77001

"You Can Help Keep Air and Water Clean"	I,J,S

8. American Petroleum Institute
1271 Avenue of the Americas
New York, New York 10020

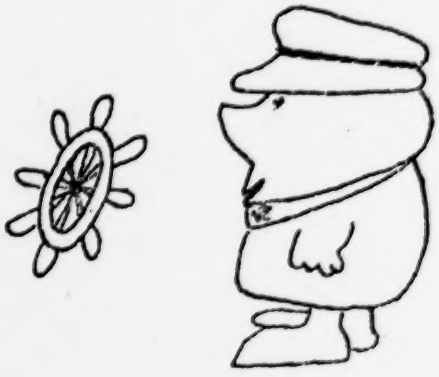
"Conserving Our Waters and Cleaning the Air"	J,S

9. Reprint Editor
The Reader's Digest
Pleasantville, New York 10570

"Crisis on Our Rivers" price: 10/50¢, 50/$2 I,J,S

C. River Pilots

The following is a listing of possible resource people and their titles. You may want to contact one of these resource people about the possibility of speaking to your class. You may also want to contact your local high school concerning students qualified to speak to your class.



JERSEY COUNTY

John Pero, Extension Adminstrator
Cooperative Extension Service, University of Illinois
405 South State, Jerseyville, Illinois Phone: 618-498-4821

Tom Lamer, District Forester
George Lessig, Fire Warden
Walden Lewis, Area Forester
Illinois Division of Forestry, Department of Conservation
124 West Pearl, Jerseyville, Illinois Phone: 618-498-2828

David Harper, Game and Fish Biologist
Illinois Department of Conservation
142 Robert Street, Jerseyville, Illinois Phone: 618-498-4243

George Threlkeld, District Conservationist
Ray Carter, Soil Conservation Technician
U.S. Dept. of Agriculture
301 South Jefferson, Jerseyville, Illinois Phone: 618-498-3712

Sue Wright, Park Interpreter
Pere Marquette State Park
Grafton, Illinois Phone: 618-786-3718

Paul Weiner, Superintendent of Sewage Treatment
New Plant - Old Otterville Road
Old Plant - Fairground Avenue
Jerseyville, Illinois Phone: 618-498-3211

Loyal Stamps, Superintendent of Water Treatment and Maintenance
Water Treatment Plant, Rt. 1
Fieldon, Illinois Phone: 618-376-4946

Sally Vasse
Audubon Society
Mark Twain Wildlife Refuge Phone: 618-883-2523

MADISON COUNTY

Dr. Harry B. Kircher, Assoc. Professor of Earth Science
Southern Illinois University
Edwardsville, Illinois Phone: 618-692-3620

Paul Hawkins, Madison County Sanitation Officer
Madison County Court House
Edwardsville, Illinois Phone: 618-656-0913

Dana Grantham, Soil Scientist
Melvern Allen, Conservation Engineer
Dale Sherrard, District Conservationist
U.S. Dept. of Agriculture
P.O. Box 482, Edwardsville, Illinois Phone: 618-656-4710

Dave Horn, Superintendent of Sanitation
Ralph Wandling, Director of Public Works
Public Works Department, City of Alton
101 East 3rd Street, Alton, Illinois Phone: 618-465-4226

Pride Incorporated
Williams and West Broadway
Alton, Illinois Phone: 618-465-3525

Norman Klueter, Chairman
Madison County Soil and Water District Committee
P.O. Box 482, Edwardsville, Illinois Phone: 618-656-7300

Joe Nash, Engineer
Laclede Steel Corporation
Alton, Illinois 62002 Phone: 618-462-9731

Ed Sullivan, Engineer
American Oil Corporation
400 South Main
Wood River, Illinois 62095 Phone: 618-254-7351

Dan Pace, Superintendent
Waste Water Treatment Plant
Chessen Lane
Alton, Illinois 62002 Phone: 618-462-2657

The following are members of the Alton Environmental Ecological Control Committee.

Dr. J. Edmund White (Chairman), Department of Chemistry
Southern Illinois University, Edwardsville, Illinois
Phone: 618-692-2042

Cornell C. Brown, employed at Laclede Steel Company
1118 Harrison Street, Alton, Illinois Phone: 618-462-9821

Richard E. Brobst, Chemist at Olin
27 Holly Hill, Alton, Illinois Phone: 618-462-7414

Nick Bono, engineer at WOKZ Radio
3105 Clay Street, Alton, Illinois Phone: 618-462-0181

Francis Hogan, engineer at Owens-Illinois
3116 Burton, Alton, Illinois Phone: 618-462-2365

Mrs. Laraine N. Rowse
807 Grove Street, Alton, Illinois Phone: 618-462-7867

Marvin Mondy, biology teacher
Alton High School, Alton, Illinois Phone: 618-462-0093

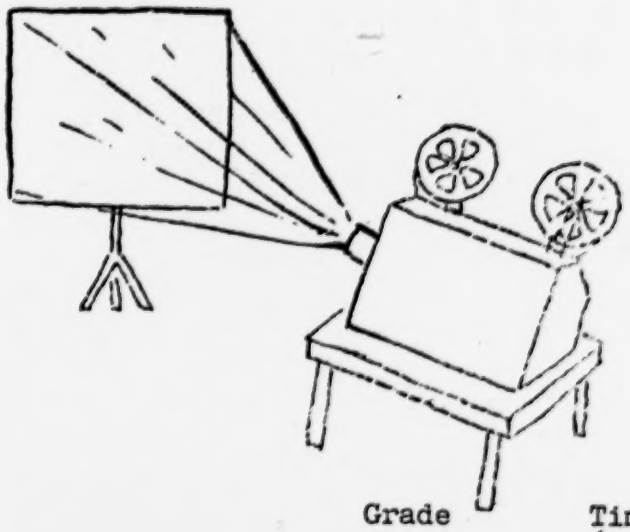
Robert Busse, Director of Parks and Recreation - Alton
Rock Springs Park, Alton, Illinois Phone: 618-462-9711

MACOUPIN COUNTY

James Pickar, Soil Conservation Service Phone: 217-854-8516
Harold Landon, Agricultural Stabilization and Conservation Service
805 North Broad Street, Carlinville, Illinois Phone: 217-854-6711

James England, Conservation Officer
Illinois Department of Conservation
R.R. 2 Carlinville, Illinois Phone: 217-854-6461

D. "Sights and Sounds Downstream"



The following is a listing of films available at the Alton Education Center, 2739 E. Broadway, Alton, Phone: 618-462-1021. All films are in color except those designated by (*) asterisk.

Alton No.	Center No.	Title	Grade Level	Time (min)
	3319	Living Things in a Drop of Water	P	10
	3369	We Explore the Stream	P	11
	3680	Conservation for Beginners	P,I	11
160	3406	How Water Helps Us	P,I	11
328	3687	Water and What It Does	P,I	11
	3713	Water: A First Film	P,I	9½
248		Your Friend the Water: Clean or Dirty*	P,I	6
238	3336	(The) Water Cycle*	I	11
	3768	Conservation: A Job for Young America	I	19
876		Water Works For Us*	I,J	13
	3544	What Makes Clouds	I,J,S	19
	3800	Problems of Conservation: Water	J,S	16
	3697	(The) Problem With Water is People	J,S,C	30

The following films may be obtained free if a teacher so desires. The films may be borrowed from the sources given below with the only cost being that of return postage. All films are in color except those designated by (*) asterisk.

TITLE OF FILM	SOURCE OF FILM	GRADE LEVEL	TIME (min.)
"Tom Leher Sings Pollution"	The Department of Conservation Film Loan Service 113 State Office Building Springfield, IL 62076 Phone: 618-525-7453	P,I,J,S	3½
"Downstream" (Canoeing Ozark Streams)	Environmental Education Specialist Jefferson National Expansion Memorial 11 N. Fourth Street St. Louis, MO 63102	P,I,J,S	30
"Heritage of Splendor"	Modern Talking Picture Service, Inc. c/o Swank Motion Pictures, Inc. 201 S. Jefferson St. Louis, MO 63103 Phone: 314-534-5211	P	14
"The Beaver"	Film Loan Service, Div. of Educ. Illinois Dept. of Conservation State Office Building, Room 113 400 S. Spring Springfield, IL 62706	P	11
"Mud" (The story of urban erosion and sedimentation)	Environmental Education Specialist Jefferson National Expansion Memorial 11 N. Fourth Street St. Louis, MO 63102	I	28
"The House of Man...Our Changing Environment" (Discussion of changes in man's life and what values he will preserve)	same as above	I,J,S	15

TITLE OF FILM	SOURCE OF FILM	GRADE LEVEL	TIME (min.)
"So Little Time" (The story of endangered waterfowl because of habitat loss)	U.S. Department of Interior Fish and Wildlife Service Bureau of Sport Fisheries and Wildlife Federal Building, Fort Snelling Twin Cities, MN 55111	I,J,S	28
"The River Must Live"	Shell Film Library 450 N. Meridian Street Indianapolis, IN 46204	I,J,S	21
"It's Your Decision- Clean Water"	Associated Sterling Films 512 Burlington Ave. LaGrange, IL 60525	I,J,S	18
"All the Difference"	Modern Talking Picture Service, Inc. Inc. c/o Swank Motion Pictures, Inc. 201 S. Jefferson St. Louis, MO 63103 Phone: 314-534-5211	I,J,S	22